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# Metal Industry Indicators

## Indicators of Domestic Primary Metals, Steel, Aluminum, and Copper Activity

April 1998

**The latest metal industry leading indexes continue to point to slow-to-moderate growth for most U.S. metal industries in the months ahead. The metals price leading index increased in February, the latest month for which it is available, while the growth rate of inventories of U.S. nonferrous metal products moved lower for the first time in 9 months. These indicators suggest the possibility that the downward trend in metal prices may be ending and growth for some prices could pick up in the coming months.**

The **primary metals leading index** moved up 0.5% in March to 128.4 from a revised 127.7 in February. The index's 6-month smoothed growth rate, a compound annual rate that measures the near-term trend, also increased, rising to 3.0% from a revised 2.7% in February.

Four of the leading index's eight indicators were available for March. A sharp rise in the S&P stock price index for diversified machinery accounted for most of the net increase in the leading index, while the next largest contribution came from the Purchasing Managers' Index. The growth rate of the Journal of Commerce Metals Price Index, which finally increased after six consecutive monthly declines, also made a modest contribution to the net increase in the leading index.

The only available indicator to decline was average weekly hours worked in primary metals establishments. After reaching 45.4 hours in January, the longest workweek in the 50-year history of the series, it fell to 44.4 in March. Similar drops in this indicator have presaged severe declines in industry activity, and the last time this series dropped that much over a 2-month span was in 1982. But during the long expansion of the U.S. economy that began in 1982 and lasted through 1990, and during another long expansion from 1961 through 1969, other sharp declines in the primary metals average workweek were not followed by a significant downturn in primary metals activity.

The growth rate of the primary metals leading index, which should be considered preliminary, is somewhat stronger this month than it was last month, but it is still lower than it was during most of 1997. Although the leading index is signaling that U.S. primary metals activity will probably continue to grow in the next few months, the rate of growth may be slower than it was last year.

The **steel leading index** increased 0.6% in February to 107.4 from 106.8 in January and the index's 6-month smoothed growth rate advanced to 3.5% from 3.0% in January. Six of the index's nine components increased in February, with the largest gains coming from increases in the S&P stock price index for steel companies, housing permits, and deflated M2 money supply. A drop of nearly an hour in the average workweek in steel mills was responsible for the largest negative contribution to the net change in the index. The steel leading index indicates continuing growth in the U.S. steel industry in the coming months.

The **aluminum mill products leading index** increased 0.5% in February to 149.7 from a revised 148.9 in January. The index's 6-month smoothed growth rate also moved up, increasing to 5.9% from a revised 5.6% in January. The components that contributed the most to the net increase in the index were increases in commercial and industrial construction contracts, building permits, and the deflated M2 money supply. The aluminum mill products leading index continues to signal moderate growth in aluminum mill products activity in the coming months.

The February **primary and secondary aluminum leading index** increased 1.0% to 246.6, from a revised 244.2 in January, while the index's 6-month smoothed growth rate increased to 3.4% from a revised 2.4%. Increases in the S&P stock price index for aluminum companies and the length of the average workweek in primary aluminum establishments accounted for most of the gain in the leading index. The primary and secondary aluminum leading index continues to point to increasing U.S. demand for aluminum, much of which will be satisfied by imports. (Tables and charts for the primary and secondary aluminum indexes are in a separate file.)

The **copper leading index** recorded its first increase in February after four consecutive declines, increasing 0.6% to 119.3 from a revised 118.6 in January. Its 6-month smoothed growth rate moved up to -3.5% from a revised -4.7% in January. Increases in the ratio of shipments to inventories for electronic and other electrical equipment and housing permits were the largest positive contributors to the net increase in the index, while a decline in average overtime hours in copper rolling, drawing, and extruding establishments was the largest negative contributor.

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Despite the increase in the February copper leading index, its growth rate remains well below -1.0%, the point which usually indicates a downward near-term trend. The copper leading index growth rate suggests flat growth or even an overall decline in domestic copper activity over the next few months.

## Metals Price Leading Index Advances

The metals price leading index advanced 0.9% in February to 98.1 from 97.2 in January, and its 6-month smoothed growth rate increased to 2.1% from 0.4% in January. The 6-month smoothed growth rates of building permits for new housing in the United States and the deflated U.S. M2 money supply, two of the four indicators in the leading index, registered strong gains in February. The growth rate of the OECD leading index, another index component, finally turned higher in February, following five consecutive declines. However, the growth rate of deflated new orders for U.S. nonferrous metals moved lower.

Another indicator of future metal prices, the growth rate of the deflated value of U.S. nonferrous metal products inventories decreased to 10.7% in February from a revised 19.4% in January. It was the first decline in this growth rate after eight straight monthly increases.

The February growth rate of the metals price leading index is once again above +1.0%, the range that normally signals a near-term upward trend in metal prices. Moreover, the slowdown in growth of inventories is also pointing to the possibility of higher metal prices. The business cycle and inventories are only two factors in price determination. Other factors that affect prices include changes in metals production, speculation, strategic stockpiling, and production costs.

**An explanation of the indexes and the 6-month smoothed growth rates appears on page 12.**

**Table 1.**
**Leading Index of Metal Prices and Growth Rates of the Nonferrous Metals Price Index, Inventories of Nonferrous Metal Products, and Selected Metal Prices**

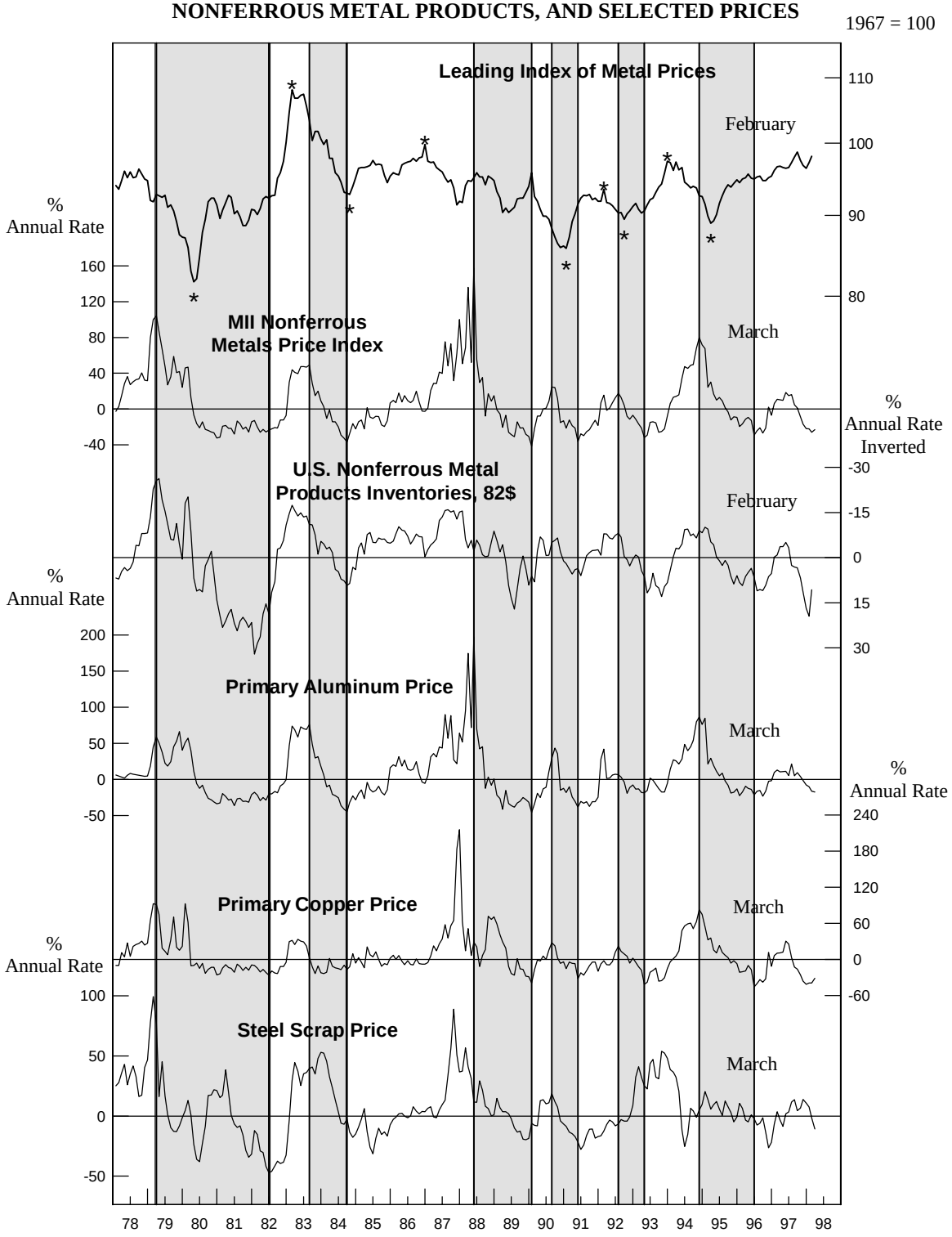
| | | Six-Month Smoothed Growth Rates | | | | |
|---|---|---|---|---|---|---|
| | Leading Index of Metal Prices (1967=100) | MII Nonferrous Metals Price Index | U.S. Nonferrous Metal Products Inventories (1982$) | Primary Aluminum | Primary Copper | Steel Scrap |
| **1997** | | | | | | |
| February | 96.6 | 11.0 | -0.9 | 12.7 | 10.5 | 3.7 |
| March | 96.7r | 10.4 | -3.7 | 10.1 | 11.2 | -3.3 |
| April | 96.5 | 9.7 | -3.7 | 10.8 | 12.2 | -8.5 |
| May | 96.4 | 18.4 | -5.1 | 11.0 | 30.7 | 2.0 |
| June | 96.5 | 15.1r | -3.3 | 5.1 | 25.8 | 3.4 |
| July | 97.2r | 16.1r | 2.6 | 21.0 | 3.4 | 11.6 |
| August | 98.0r | 4.7r | 3.1 | 4.6 | -12.5 | 13.6 |
| September | 98.7 | 1.2r | 3.4 | 9.3 | -15.9 | 4.6 |
| October | 97.5 | -8.7r | 6.8r | 3.6 | -25.3 | 6.7 |
| November | 96.8 | -17.0 | 11.5r | -1.9 | -35.9 | 13.8 |
| December | 96.4 | -21.8r | 16.8 | -7.9 | -41.3 | 10.8 |
| **1998** | | | | | | |
| January | 97.2 | -22.2 | 19.4r | -10.4 | -38.8 | 7.6 |
| February | 98.1 | -26.0 | 10.7 | -16.5 | -38.9 | -1.7 |
| March | NA | -23.0 | NA | -17.6 | -31.0 | -10.7 |

***r:*** *Revised*

**Note:** The components of the Leading Index of Metal Prices are the 6-month smoothed growth rates of the following: 1, the deflated value of new orders for nonferrous metals; 2, the OECD leading index, total; 3, the index of new private housing units authorized; and 4, the deflated value of U.S. M2 money supply. The Metal Industry Indicators (MII) Nonferrous Metals Price Index measures changes in end-of-the-month prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange (LME). The steel scrap price used is the price of No. 1 heavy melting. Inventories consist of the deflated value of finished goods, work in progress, and raw materials for U.S.-produced nonferrous metals and nonferrous metal products. Six-month smoothed growth rates are based on the ratio of the current month's index or price to its average over the preceding 12 months, expressed at a compound annual rate.

**Sources:** U.S. Geological Survey (USGS); American Metal Market (AMM); the London Metal Exchange (LME); the Bureau of the Census; and the Organization for Economic Cooperation and Development (OECD).

**CHART 1.**
**LEADING INDEX OF METAL PRICES AND GROWTH RATES OF NONFERROUS METALS PRICE INDEX, INVENTORIES OF NONFERROUS METAL PRODUCTS, AND SELECTED PRICES**




Shaded areas are downturns in the nonferrous metals price index growth rate. Asterisks (*) are peaks and troughs in the economic activity reflected by the leading index of metal prices. Scale for nonferrous metal products inventories is inverted.

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## Table 2.
## The Primary Metals Industry Indexes and Growth Rates

| | Leading Index | | Coincident Index | |
|---|---|---|---|---|
| | (1977 = 100) | Growth Rate | (1977 = 100) | Growth Rate |
| **1997** | | | | |
| April | 124.1 | 5.3 | 110.7 | 3.9 |
| May | 125.1 | 6.3 | 110.5 | 2.9 |
| June | 125.6 | 6.4 | 111.0 | 3.3 |
| July | 126.4 | 6.9 | 111.2 | 3.0 |
| August | 127.5 | 7.6 | 111.8 | 3.5 |
| September | 127.4 | 6.5 | 112.2 | 3.6 |
| October | 127.6 | 5.8 | 112.9r | 4.3 |
| November | 127.2r | 4.1r | 113.3 | 4.5 |
| December | 126.8r | 2.7r | 113.3r | 3.8r |
| **1998** | | | | |
| January | 126.9r | 2.2r | 114.2r | 4.7r |
| February | 127.7r | 2.7r | 113.7 | 3.3 |
| March | 128.4 | 3.0 | NA | NA |

***r:*** *Revised*

**Note**: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

## Table 3.
## The Contribution of Each Primary Metals Index Component to the Percent Change in the Index from the Previous Month

| **Leading Index** | **February** | **March** |
|---|---|---|
| 1. Average weekly hours, primary metals (SIC 33) | -0.7r | -0.6 |
| 2. S&P stock price index, machinery, diversified | 0.4r | 0.7 |
| 3. Ratio of price to unit labor cost (SIC 33) | 0.1 | NA |
| 4. JOC metals price index growth rate | 0.0r | 0.1 |
| 5. New orders, primary metals, (SIC 33) 1982$ | 0.2 | NA |
| 6. Index of new private housing units authorized by permit | 0.3 | NA |
| 7. Growth rate of U.S. M2 money supply, 1992$ | 0.3 | NA |
| 8. Purchasing Managers' Index | 0.1r | 0.3 |
| Trend adjustment | 0.0 | 0.0 |
| Percent change (except for rounding differences) | 0.7r | 0.5 |

| **Coincident Index** | **January** | **February** |
|---|---|---|
| 1. Industrial production index, primary metals (SIC 33) | 0.2r | -0.1 |
| 2. Total employee hours, primary metals (SIC 33) | 0.2 | -0.6 |
| 3. Value of shipments, primary metals, (SIC 33) 1982$ | 0.3r | 0.2 |
| Trend adjustment | 0.1 | 0.1 |
| Percent change (except for rounding differences) | 0.8r | -0.4 |

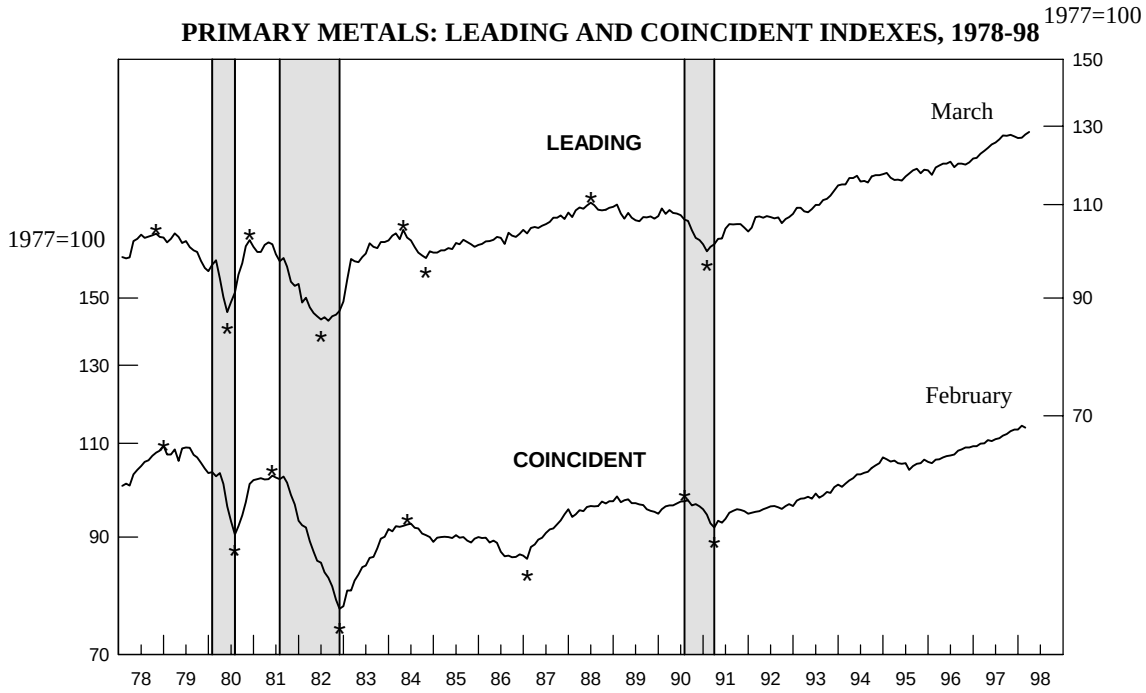
**Sources**: Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's; 3, Center for International Business Cycle Research, Bureau of Labor Statistics, and Federal Reserve Board; 4, Journal of Commerce; 5, Bureau of the Census and U.S. Geological Survey; 6, Bureau of the Census and U.S. Geological Survey; 7, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 8, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey; 3, Bureau of the Census and U.S. Geological Survey. All series are seasonally adjusted, except 2, 3, and 4 of the leading index.

***NA****: Not available* ***r:*** *Revised*

**Note**: A component's contribution, shown in Tables 3, 5, 7, and 9, measures its effect, in percentage points, on the percent change in the index. Each month, the sum of the contributions plus the trend adjustment equals (except for rounding differences) the index's percent change from the previous month.

**CHART 2.**

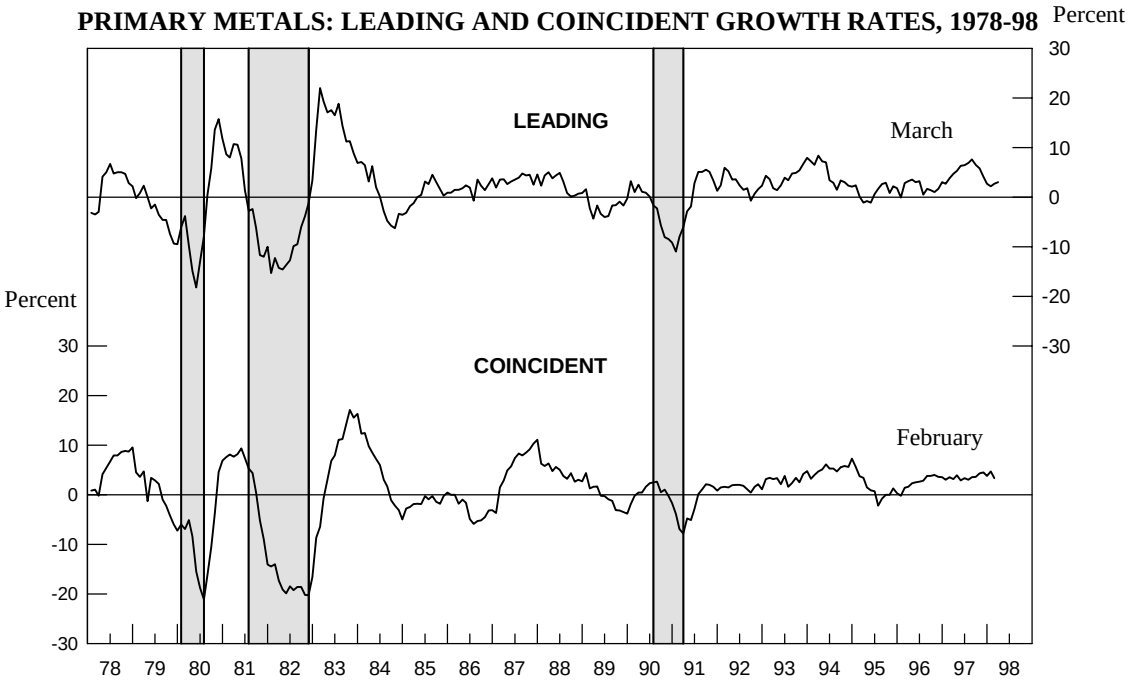
**PRIMARY METALS: LEADING AND COINCIDENT INDEXES, 1978-98**




Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

**CHART 3.**

**PRIMARY METALS: LEADING AND COINCIDENT GROWTH RATES, 1978-98**




Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, April 1998

## Table 4.
## The Steel Industry Indexes and Growth Rates

| | Leading Index | | Coincident Index | |
|---|---|---|---|---|
| | (1977 = 100) | Growth Rate | (1977 = 100) | Growth Rate |
| **1997** | | | | |
| March | 104.0 | 2.7 | 99.2 | 1.4 |
| April | 103.8 | 2.1 | 99.7 | 2.1 |
| May | 103.9 | 2.3 | 99.4 | 1.2 |
| June | 104.7 | 3.5 | 99.6 | 1.4 |
| July | 104.3 | 2.7 | 99.5 | 1.0 |
| August | 106.1 | 5.6 | 99.8 | 1.4 |
| September | 106.9 | 6.3 | 100.5 | 2.4 |
| October | 107.0 | 5.7 | 100.8r | 2.7r |
| November | 107.2r | 5.2r | 100.7 | 2.3 |
| December | 107.1 | 4.2 | 101.0 | 2.5 |
| **1998** | | | | |
| January | 106.8 | 3.0 | 101.7r | 3.4r |
| February | 107.4 | 3.5 | 101.4 | 2.5 |

***r:*** *Revised*

**Note**: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

## Table 5.
## The Contribution of Each Steel Index Component to the Percent Change in the Index from the Previous Month

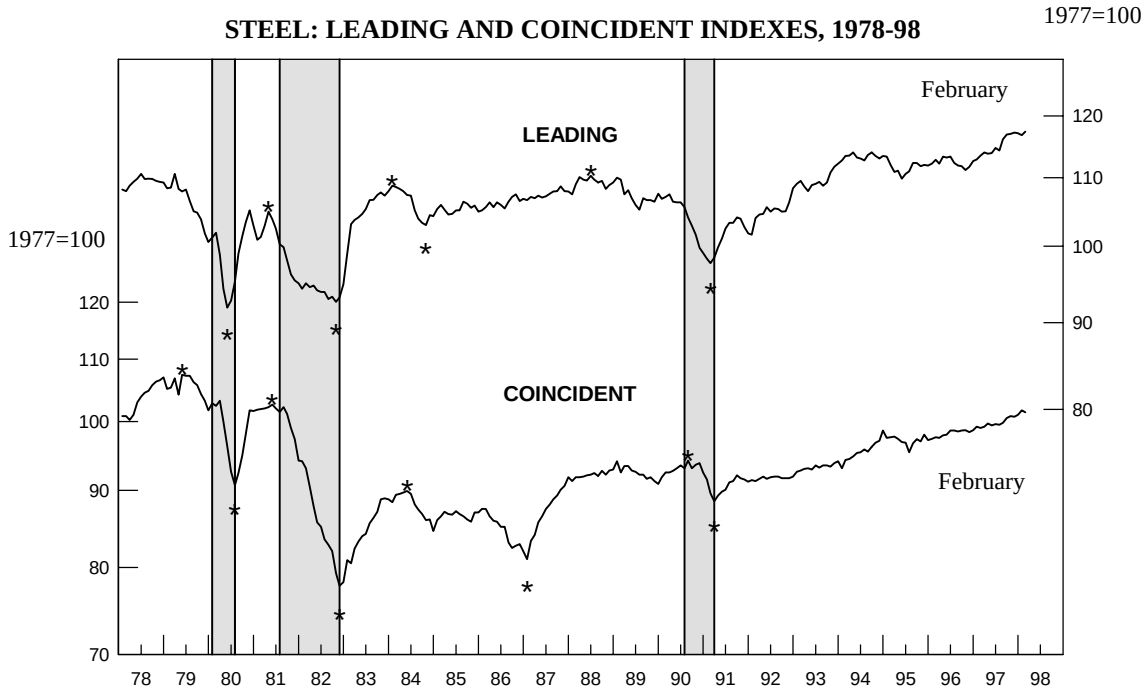
| | January | February |
|---|---|---|
| **Leading Index** | | |
| 1. Average weekly hours, blast furnaces and basic steel products (SIC 331) | 0.4 | -0.6 |
| 2. New orders, steel works, blast furnaces, and rolling and finishing mills, 1982$, (SIC 331) | -0.4 | 0.2 |
| 3. Shipments of household appliances, 1982$ | -0.4r | 0.2 |
| 4. S&P stock price index, steel companies | 0.0 | 0.3 |
| 5. Industrial production index for automotive products | -0.1 | -0.1 |
| 6. Growth rate of the price of steel scrap (#1 heavy melting, $/ton) | -0.1 | -0.1 |
| 7. Index of new private housing units authorized by permit | 0.1 | 0.3 |
| 8. Growth rate of U.S. M2 money supply, 1992$ | 0.2 | 0.3 |
| 9. Purchasing Managers' Index | -0.1 | 0.1 |
| Trend adjustment | 0.0 | 0.0 |
| Percent change (except for rounding differences) | -0.4r | 0.6 |
| **Coincident Index** | | |
| 1. Industrial production index, basic steel and mill products (SIC 331) | 0.1r | 0.0 |
| 2. Value of shipments, steel works, blast furnaces, and rolling and finishing mills (SIC 331), 1982$ | -0.1 | 0.1 |
| 3. Total employee hours, blast furnaces and basic steel products (SIC 331) | 0.5 | -0.5 |
| Trend adjustment | 0.1 | 0.1 |
| Percent change (except for rounding differences) | 0.6r | -0.3 |

**Sources**: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, Bureau of the Census and U.S. Geological Survey; 4, Standard & Poor's; 5, Federal Reserve Board; 6, Journal of Commerce and U.S. Geological Survey; 7, Bureau of the Census and U.S. Geological Survey; 8, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 9, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of the Census and U.S. Geological Survey; 3, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted, except 4 and 6 of the leading index.

***NA:*** *Not available* ***r:*** *Revised*

**CHART 4.**

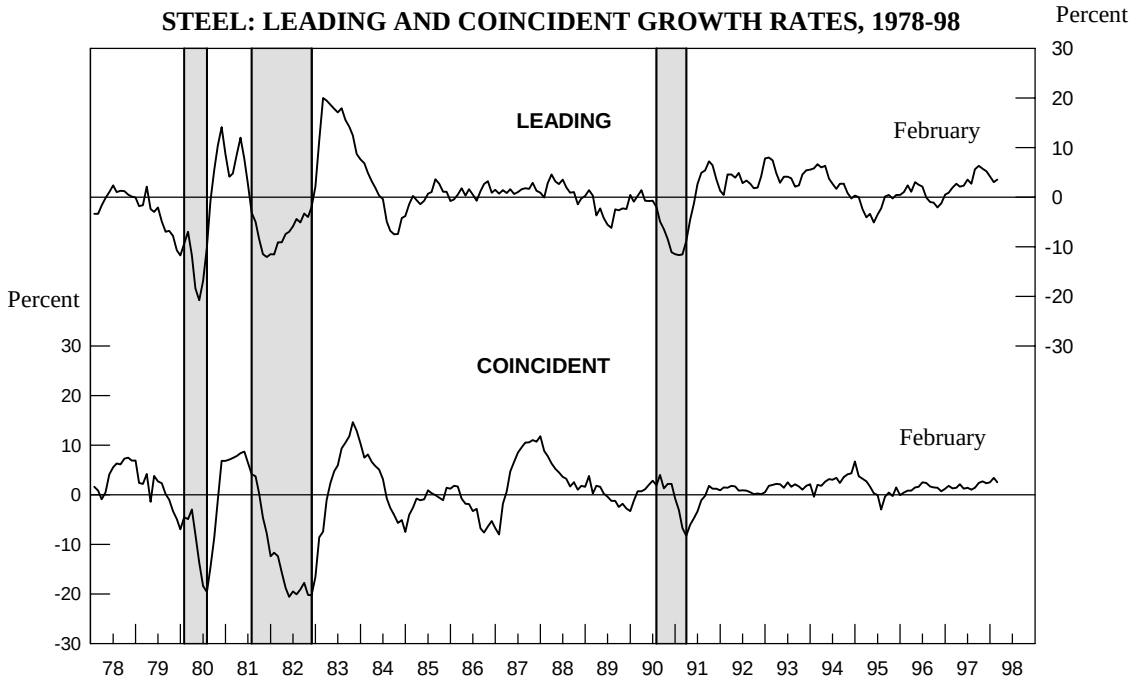
**STEEL: LEADING AND COINCIDENT INDEXES, 1978-98**




Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

**CHART 5.**

**STEEL: LEADING AND COINCIDENT GROWTH RATES, 1978-98**




Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, April 1998

## Table 6.
## The Aluminum Mill Products Industry Indexes and Growth Rates

| | Leading Index | | Coincident Index | |
|---|---|---|---|---|
| | (1977 = 100) | Growth Rate | (1977 = 100) | Growth Rate |
| **1997** | | | | |
| March | 142.8 | 4.5 | 126.1 | 3.5 |
| April | 143.5 | 4.8 | 125.9 | 2.9 |
| May | 143.7 | 4.5 | 125.7 | 2.2 |
| June | 143.7 | 3.9 | 127.1 | 3.9 |
| July | 143.9 | 3.8 | 127.6 | 4.0 |
| August | 144.6 | 4.1 | 126.9r | 2.3r |
| September | 146.8 | 6.4 | 127.6r | 3.0r |
| October | 148.1r | 7.5 | 127.6 | 2.7 |
| November | 145.9 | 3.3r | 127.9 | 2.7 |
| December | 147.2r | 4.2r | 126.0r | -0.5r |
| **1998** | | | | |
| January | 148.9r | 5.6r | 128.8r | 3.4r |
| February | 149.7 | 5.9 | 127.6 | 1.0 |

***r:*** *Revised*

**Note**: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

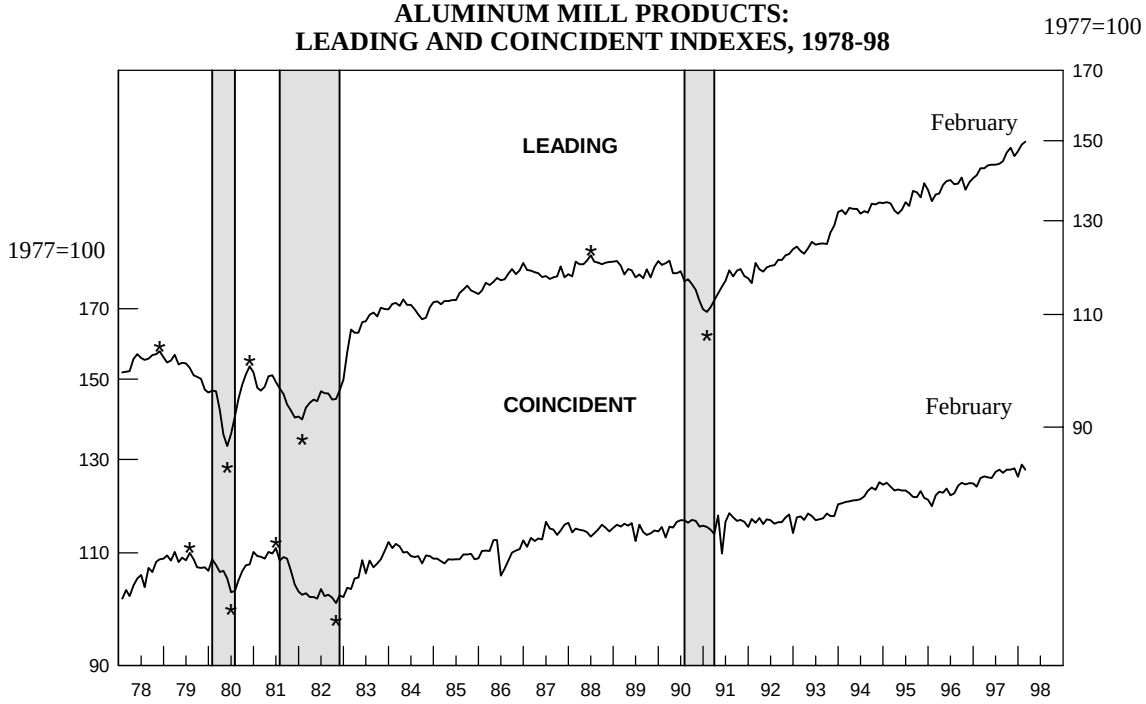
## Table 7.
## The Contribution of Each Aluminum Mill Products Index Component to the Percent Change in the Index from the Previous Month

| **Leading Index** | **January** | **February** |
|---|---|---|
| 1. Average weekly hours, aluminum sheet, plate, and foil (SIC 3353) | 1.0r | -0.6 |
| 2. Index of new private housing units authorized by permit | 0.2 | 0.3 |
| 3. Industrial production index for automotive products | -0.1 | -0.1 |
| 4. Construction contracts, commercial and industrial (square feet) | 0.1 | 0.3 |
| 5. Net new orders for aluminum mill products (pounds) | -0.3 | 0.0 |
| 6. Growth rate of U.S. M2 money supply, 1992$ | 0.2 | 0.3 |
| 7. Purchasing Managers' Index | -0.1 | 0.1 |
| Trend adjustment | 0.1 | 0.1 |
| Percent change (except for rounding differences) | 1.1r | 0.4 |
| **Coincident Index** | | |
| 1. Industrial production index, aluminum sheet, plate, and foil (SIC 3353) | 0.5r | -0.3 |
| 2. Total employee hours, aluminum sheet, plate, and foil (SIC 3353) | 1.2 | -0.8 |
| 3. Shipments of aluminum mill products (pounds) | 0.4r | 0.0 |
| Trend adjustment | 0.1 | 0.1 |
| Percent change (except for rounding differences) | 2.2r | -1.0 |

**Sources:** Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, Federal Reserve Board; 4, F.W. Dodge, Division of McGraw-Hill Information Systems Company; 5, The Aluminum Association, Inc. and U.S. Geological Survey; 6, Federal Reserve Board, Conference Board, and U.S. Geological Survey; 7, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey; 3, Bureau of the Census and U.S. Geological Survey. All series are seasonally adjusted.

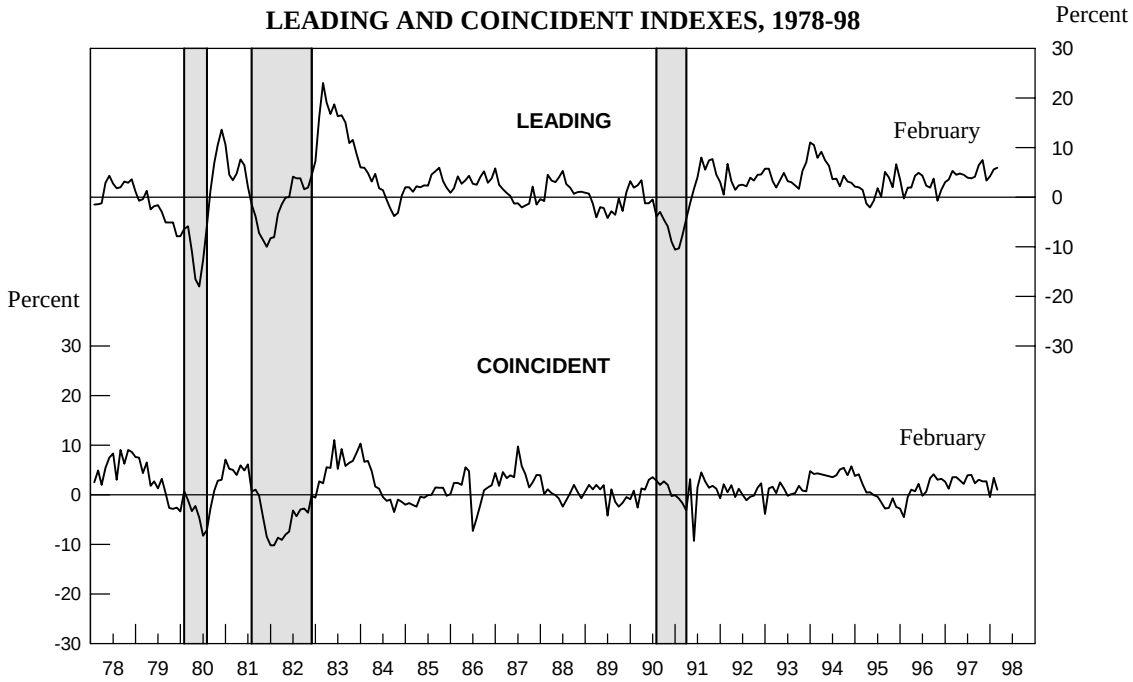
***NA:*** *Not Available* ***r:*** *Revised*

**CHART 6.**
**ALUMINUM MILL PRODUCTS:**
**LEADING AND COINCIDENT INDEXES, 1978-98**




Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

**CHART 7.**
**ALUMINUM MILL PRODUCTS:**
**LEADING AND COINCIDENT INDEXES, 1978-98**




Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, April 1998

## Table 8.
## The Copper Industry Indexes and Growth Rates

| | Leading Index | | Coincident Index | |
|---|---|---|---|---|
| | (1977 = 100) | Growth Rate | (1977 = 100) | Growth Rate |
| **1997** | | | | |
| March | 123.5 | 6.1 | 114.2 | 0.6 |
| April | 121.8 | 2.7 | 114.6 | 1.0 |
| May | 122.7 | 3.9 | 113.6 | -0.9 |
| June | 122.8 | 3.7 | 114.2 | 0.1 |
| July | 121.7 | 1.4 | 114.0 | -0.4 |
| August | 122.3 | 1.9 | 114.8 | 1.0 |
| September | 123.4 | 3.2 | 115.5 | 2.0 |
| October | 121.7 | 0.0 | 116.4 | 3.2 |
| November | 120.2 | -2.6 | 115.7r | 1.9r |
| December | 119.2 | -4.0 | 115.9 | 2.0 |
| **1998** | | | | |
| January | 118.6r | -4.7r | 117.3r | 4.0r |
| February | 119.3 | -3.5 | 116.0 | 1.6 |

***r:*** *Revised*

**Note**: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

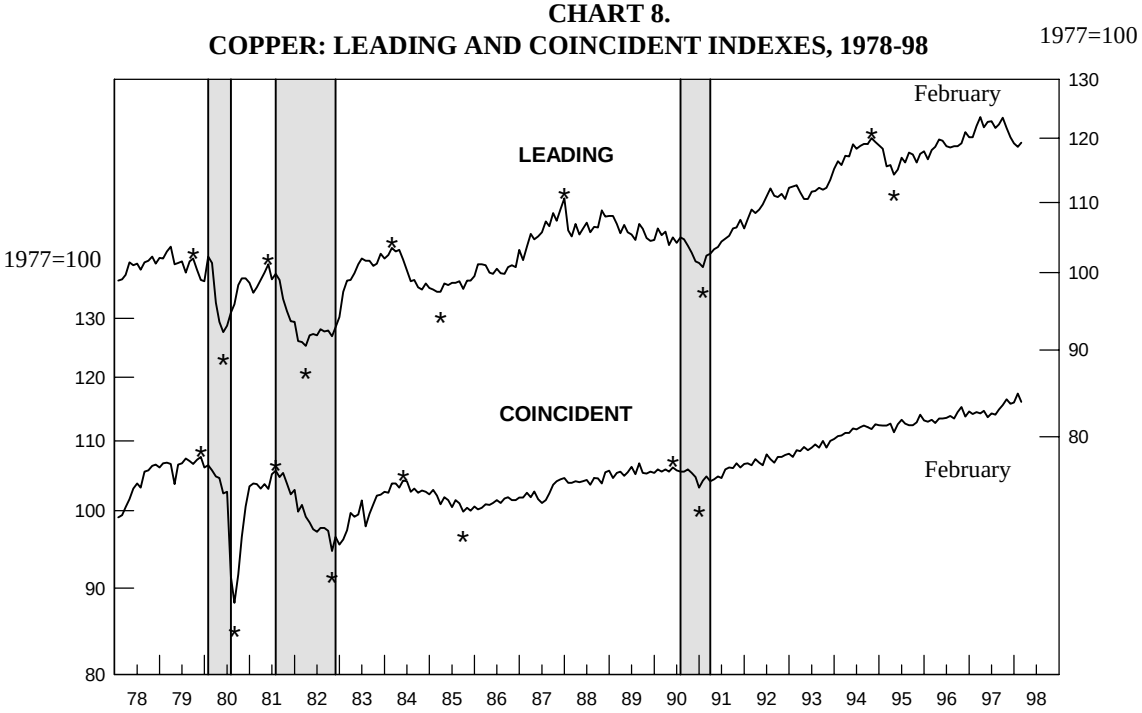
## Table 9.
## The Contribution of Each Copper Index Component to the Percent Change in the Index from the Previous Month

| **Leading Index** | **January** | **February** |
|---|---|---|
| 1. Average weekly overtime hours, rolling, drawing, and extruding of copper (SIC 3351) | 0.0r | -0.5 |
| 2. New orders, nonferrous and other primary metals, 1982$ | 0.5 | -0.1 |
| 3. MII stock price index, copper companies | -0.4 | 0.2 |
| 4. Ratio of shipments to inventories, electronic and other electrical equipment (SIC 36) | -0.9r | 0.7 |
| 5. Growth rate of the LME spot price of primary copper | 0.1 | 0.0 |
| 6. Index of new private housing units authorized by permit | 0.2 | 0.4 |
| Trend adjustment | 0.0 | 0.0 |
| Percent change (except for rounding differences) | -0.5r | 0.7 |
| **Coincident Index** | | |
| 1. Industrial production index, primary smelting and refining of copper (SIC 3331) | -0.1 | 0.0 |
| 2. Total employee hours, rolling, drawing, and extruding of copper (SIC 3351) | 0.7r | -1.2 |
| 3. Copper refiners' shipments (short tons) | 0.5 | 0.1 |
| Trend adjustment | 0.1 | 0.1 |
| Percent change (except for rounding differences) | 1.2r | -1.0 |

**Sources**: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, U.S. Geological Survey; 4, Bureau of the Census and U.S. Geological Survey; 5, London Metal Exchange and U.S. Geological Survey; 6, Bureau of the Census and U.S. Geological Survey. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics; 3, American Bureau of Metal Statistics, Inc. and U.S. Geological Survey. All series are seasonally adjusted, except 3 and 5 of the leading index.

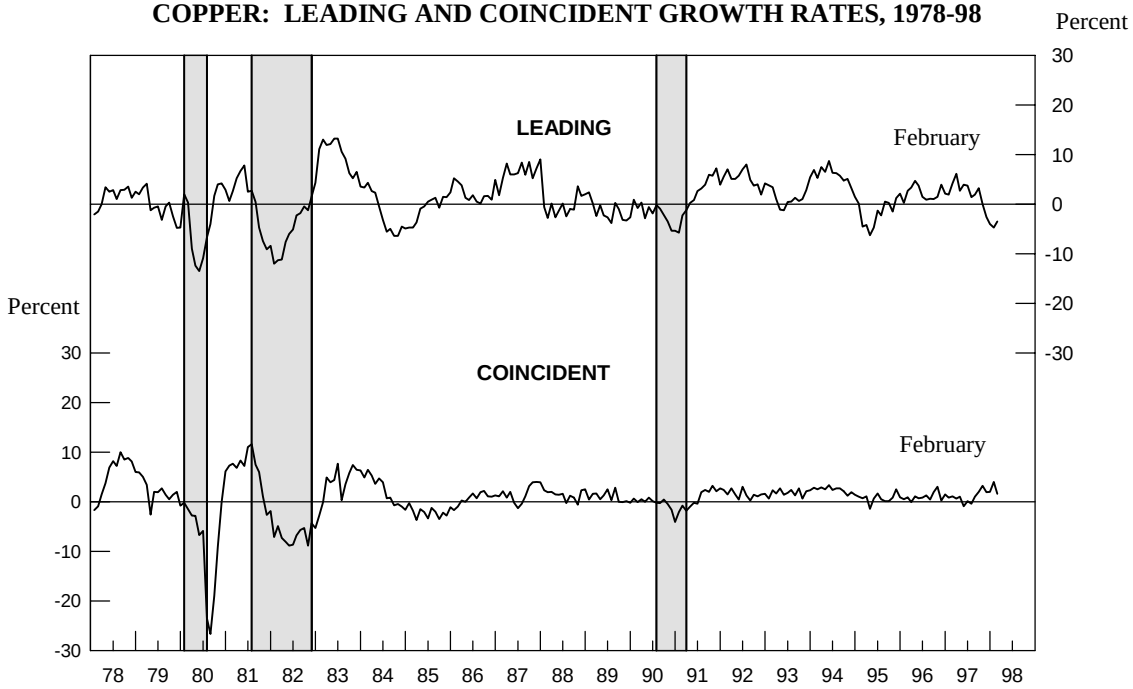
***NA:*** *Not available* ***r:*** *Revised*

**CHART 8.**
**COPPER: LEADING AND COINCIDENT INDEXES, 1978-98**




Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

**CHART 9.**
**COPPER: LEADING AND COINCIDENT GROWTH RATES, 1978-98**




Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, April 1998

## Explanation

Each month, the U.S. Geological Survey tracks the effects of the business cycle on five U.S. metal industries by calculating and publishing composite indexes of leading and coincident indicators. Wesley Mitchell and Arthur Burns originated the cyclical-indicators approach for the economy as a whole at the National Bureau of Economic Research in the mid-1930's. Over subsequent decades this approach was developed and refined, mostly at the National Bureau, under the leadership of Geoffrey H. Moore.[1]

A business cycle can briefly be described as growth in the level of economic activity followed by a decline succeeded by further growth. These alternating periods of growth and decline do not occur at regular intervals. Composite indexes, however, can help determine when highs and lows in the cycle might occur. A composite index combines cyclical indicators of diverse economic activity into one index, giving decision makers and economists a single measure of how changes in the business cycle are affecting economic activity.

The indicators in the metal industry leading indexes historically give signals several months in advance of major changes in a coincident index, a measure of current metal industry activity. Indicators that make up the leading indexes are, for the most part, measures of anticipations or new commitments to various economic activities that can affect the metal industries in the months ahead.

Composite coincident indexes for the metal industries consist of indicators for production, shipments, and total employee hours worked. As such, the coincident indexes can be regarded as measures of the economic health of the metal industries.

Three of the metal industry coincident indexes, those for primary metals, steel, and aluminum mill products, reflect their classifications in the U.S. Standard Industrial Classification (SIC). The SIC is the main classification used by the United States government and industry in collecting and tabulating economic statistics. Two of the coincident indexes, one for copper and one for primary and secondary aluminum, are blends of two different copper and aluminum industries, respectively.

Of the five metal industries, primary metals is the broadest, consisting of twenty-six different metal processing industries. The steel, aluminum, and copper industries are parts of the primary metals industry.

The metal industry leading indexes turn before their respective coincident indexes an average of 9 months for primary metals, 8 months for steel, and 7 months for copper. The average lead time for the leading indexes of aluminum mill products and primary and secondary aluminum is 6 months.

The leading index of metal prices, also published in the Metal Industry Indicators, is designed to signal changes in a composite index of prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange. On average, this leading index indicates significant changes in price growth about 7 months in advance.

The growth rate used in the Metal Industry Indicators is a 6-month smoothed growth rate at a compound annual rate, calculated from a moving average. Moving averages smooth fluctuations in data over time so that trends can be observed. The 6-month smoothed growth rate is based upon the ratio of the latest monthly value to the preceding 12-month moving average.

$$\left[\left(\frac{\textit{current value}}{\textit{preceding 12-month moving average}}\right)^{\frac{12}{6.5}} - 1.0\right] * 100$$

Because the interval between midpoints of the current month and the preceding 12 months is 6.5 months, the ratio is raised to the 12/6.5 power to derive a compound annual rate.

The growth rates measure the near-term industry trends. They, along with other information about the metal industries and the world economy, are the main tools used to determine the outlook of the industries. A 6-month smoothed growth rate above +1.0% usually means increasing growth; a rate below -1.0% usually means declining growth.

**The next summary is scheduled for release on MINES FaxBack at 10:00 a.m. EDT, Friday, May 22. Access MINES FaxBack from a touch-tone telephone attached to a fax machine by dialing 703-648-4999. The address for Metal Industry Indicators on the World Wide Web is: http://minerals.er.usgs.gov/minerals/pubs/mii/**

The **Metal Industry Indicators** is produced at the U.S. Geological Survey by the Minerals Information Team. The report is prepared by Kenneth Beckman (703-648-4916), e-mail (kbeckman@usgs.gov), and Gail James (703-648-4915), e-mail (gjames@usgs.gov). The Center for International Business Cycle Research, under the direction of Dr. Geoffrey H. Moore, and the former U.S. Bureau of Mines developed the metal industry leading and coincident indexes in the early 1990's. Customers can send mail concerning the Metal Industry Indicators to the following address:

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[1] **Business Cycle Indicators, A monthly report from The Conference Board** (March 1996).